Special article

# Noxious Air Pollution

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Air pollution is a by-product of human occupational and domestic activity. In former time, especially in Western countries, the principal pollutants inhaled from urban and industrial atmospheres arise from the combustion of coal and gas for locomotion, power production and space heating. Nowadays, important sources of air contamination are industrial operations, the combustion of fossil fuels from motor vehicles, and incineration of waste. The concentration of the pollutants depends upon the intensity of those activities, the control and disposal of by-products and wastes and local meteorologic and topographic factors. Surrounding mountains and hills and crowded sky-high buildings reduce wind velocity and promote atmospheric stability. When the atmosphere is stable and sunny conditions prevail in the presence of heavy automotive fuel combustion, the pattern of oxidizing air pollution called photochemical smog is found.

Of historic note, **smog**, a word representing a type of severe air pollution, was coined in the early 20th century as a blending of the words smoke and fog to refer to smoky fog[1]. It is often categorized as being either summer smog or winter smog. The former incident, which occurs during the summer season, is primarily associated with the photochemical formation of ozone when the temperatures are warm with more sunlight present. While the winter smog formation occurs during the winter months when the temperatures are colder together with an increase in coal and other fossil usage and the lack of pollutant dispersion under atmospheric inversions. The famous event known as **London smog**, or Great Smog of 1952, was a severe air-pollution event that took place in London over five days from Friday, 5 December, to Tuesday, 9 December 1952. During that time, a layer of warm air settled over the city, trapping colder air near ground level. The smog that resulted was so thick in places that visibility was said to have fallen to 12 inches. The developing smog was toxic to humans and cause sickness, or premature death. The pollutants, however, dispersed quickly when the weather changed.

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**Figure 1** London's Great Smog 1952

https://scroll.in/article/812898/what-causes-asthma-clues-from-londons-great-smog-with-implications-for-air-pollution-today

Photochemical smog, as found for example in Los Angeles, the **LA smog** so-called, is a type of air pollution derived from vehicular emission from internal combustion engines and industrial fumes. These pollutants react in the atmosphere with sunlight to form secondary pollutants that also combine with the primary emissions to form photochemical smog. The atmospheric pollution levels of Los Angelis, Beijing, Delhi, and other cities, as well as **Bangkok** in January-February 2019 are increased by an inversion that traps pollution close to the ground.

**Figure 2** The skyline of downtown Los Angeles, including City Hall (center), the United States Courthouse (left), and Hall of Justice (right), shrouded by smog in 1956.

https://timeline.com/la-smog-pollution-4ca4bc0cc95d

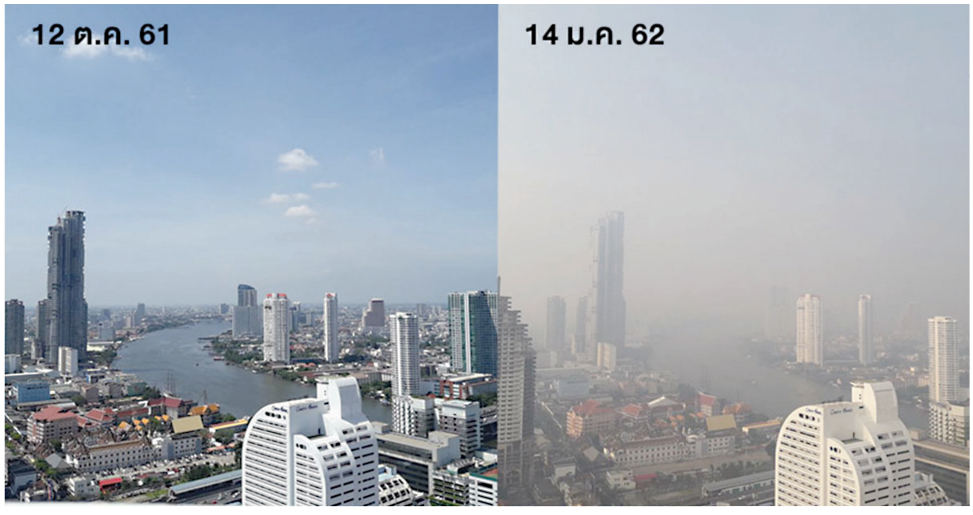


**Figure 3** Bangkok Smog: Right January 14, 2019 Left October 12, 2018

https://workpointnews.com/2019/01/14/เปรียบเทียบชัด-ฝุ่น0002/

The gases that pollute the atmosphere can be listed by their sources of production. The gas combustion from motor vehicles gives rise to carbon monoxide, nitrogen oxides and volatile hydrocarbons. The burning of coal and heavy oil for production of electrical energy constitutes the principal source of sulfur dioxide. The reaction between nitrogen dioxide and a variety of organic substances, notably hydrocarbons, in the presence of sunlight yields ozone and other oxidants and the eye irritant peroxy-acetyl nitrate.

Particulate air pollutants (particulate matters) vary in size and physical state. Large particles (PM10 and over) are solid and settle rapidly. Fume or smoke particles smaller than 5 micrometers in diameter (the so-called PM2.5 nowadays) stay suspended as solids or droplets in the air for a long time. The chemical composition of the suspended particles varies from carbon, soot, tar and organic compounds to metal released by local industrial processes. The adverse effects of inspired particles on the respiratory system are related to their size. Alveolar deposition of particles occurs when their diameter is less than 10 micrometers and is high when their diameter is less than 4 micrometers.

Air pollution was clearly associated with acute episodes of respiratory disease during disasters[2]. Current evidence supports the view that community air pollution alone does not cause respiratory disease. However, accumulation of air pollutants under unfavorable meteorologic conditions can initiate exacerbations of chronic respiratory disease and aggravate its course.

## References

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## Additional Readings

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